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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/761,343  
Filing Date: January 22, 2004  
Appellant(s): CHAN ET AL.

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Terry W. Kramer  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 4/21/2008 appealing from the Office action mailed 12/04/2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims (1-4 and 9-12) contained in the brief is correct. The statement of the status of claims 5 and 6 is incorrect in that they were rejected under 35 USC §112, second paragraph, and that rejection is now withdrawn.

Claims 5 and 6 are objected to as being dependent upon a rejected base claim (claim 2), but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: Claims 9-10 are rejected under 35 U.S.C. §112, second paragraph, as alleged being indefinite.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

The following is a list of the evidence relied upon in the rejection of the claims under appeal:

US 2003/0043560 Clarkson et al. March 6th, 2003.

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 9-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Examiner remarks: As shown in the Office action mailed on 12/4/2007, claims 9 and 10 were rejected by the same reasons as the rejected claims 7 and 8 which were now cancelled by the Applicants.

**Regarding claim 9**, the limitations, "a first shared via in said via column Col(i) and said via row R(j) provides a power contact to a first associated ball contact pad in said via column c(i) and said via row r(j+1) and to a second associated ball contact pad

in said via column  $c(i+1)$  and said via row  $r(j)$ ", do not particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) Claim 2 has defined  $2m$  vias in via column  $Col(i)$  are depopulated to obtain a free space. Therefore, the shared via is not in  $Col(i)$ , but in  $Col(i+1)$ . For continuing examination, the Examiner assumes the shared via in  $Col(i+1)$  is correct, instead of  $Col(i)$ . It is also noted that the shared vias can be in  $Col(i-1)$  or  $Col(i+1)$ , but it can never be in  $Col(i)$ , since  $Col(i)$  is where a free space is set up.

(b) By assuming the shared via is in  $Col(i+1)$ , then the contact pads (for power contact) connecting to the power shared via in  $Col(i+1)$  must be at  $c(i+1)$  and  $c(i+2)$  instead of  $c(i)$  and  $c(i+1)$  respectively. Thus, for continuing examination the power contact pads at  $c(i+1)$  and  $c(i+2)$  are considered.

(c) By the above assumptions, the Examiner further assumes  $i=3$ ,  $j=4$ , and  $m=1$ , then based on claim 2, the power shared via is at  $\{Col(4), R(4)\}$  and the power contact pads are at  $\{c(4), r(4)\}$  and  $\{c(5), r(5)\}$ . The Examiner strongly believes there is an error in such arrangement of pads; because with this arrangement, for each power via there is at least one pad formed 3 rows down from its connected via and this not what described in the Specification.

For example, the power via at  $\{Col(4), R(4)\}$  has one of its pad at  $\{c(5), r(5)\}$ , which is 3 rows down from row  $R(4)$ . That is from  $R(4)$  to  $r(4)$ ,  $R(5)$ , and then resides at  $r(5)$ .

The Examiner has tried to fix the error by moving the via back one row by changing the  $r(j+1)$  to  $r(j)$ . However, this will lead to the same structure as shown in

claims 5-6. Therefore, the Examiner does not know what the actual structure the applicants try to claim. Because of this reason, claim 9 is withdrawn from consideration in this Office action.

**Regarding claim 10**, with exactly the same logic as discussed in claim 9 above, the shared via is at Col(i+1) instead of Col(i) and the ground contact pads at c(i+1) and c(i+2) are considered. Then, by assuming i=3, j=4, and m-1, the Examiner encounters the problem as described in claim 9 above that there is at least one pad formed 3 rows down from its connected via and this not what described in the Specification. Therefore, claim 10 is not considered in this Office action.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-4 are rejected under 35 U.S.C. 102(e) as being anticipated by Clarkson et al. (US 20030043560, hereafter Clarkson).

**Regarding claim 1**, at least as shown in figures 2A and 4B, Clarkson discloses a printed wiring board for mounting a high performance ball grid array (BGA) device on one side of the PWB comprising:

(a) a modified vias array (circular shapes as shown in the figures, see figure 2 for example),

(b) the modification being that at least a portion of one column of vias array (Figure 2A, the channel in between references 183 and 184) is missing at least two adjacent vias (arbitrarily selecting any two vias in the column), wherein the missing vias have been replaced by respective shared vias in an adjacent row (see figure 4B, paragraph 30, ground/power vias and decoupling capacitors), and the shared vias have been connected to either a power supply or a power return (par.30)

(c) a via pad (square shapes as shown in the figures) for each shared vias (every via has a via pad) located on the other side of the PWB in the portion,

(d) whereby a decoupling capacitor (no reference number, see figures 4A-B, capacitors are mounted to power and ground vias, see paragraph 30) can be electrically connected across the pair of via pads to decouple the power supply and the power return at the two adjacent vias.

**Regarding claim 2**, at least as shown in figures 2A and 4B, Clarkson discloses a printed wiring board (PWB) for mounting a high performance integrated circuit, comprising:

(a) on a top side of the PWB (figure 4A), a modified via array with BGA columns and BGA rows of ball connection pads (see figures 2A-B for clearer illustration of vias and pads);

(b) a modified vias array of plated through hole vias (see par.18, reference characters 180-187, figure 2A), with each via column Col(n) arranged between two

respective BGA columns  $c(n)$  and  $c(n+1)$  and each via row  $R(k)$  arranged between two respective BGA rows  $r(k)$  and  $r(k-1)$ ,

(c) wherein 2 vias (considering  $m=1$ ) of the via column  $Col(i=5)$  placed in successive via rows  $R(j=2)$  to  $R((2+2-1)=3)$  of the modified vias array are depopulated (removed vias, see channel 130/135 in figures 2A-2B for example and par. 25) to obtain a free space on the back side of the PWB, and

(d) wherein 2 corresponding vias (considering  $m=1$ ) in a via column  $C(i+1=6)$  adjacent to column  $Col(5)$  and placed in the successive rows  $R(2)$  to  $R(3)$  of the vias array are shared vias (ground and power vias, see par.30), and

(e) wherein  $n>1$ ,  $k>2$ ,  $2<i<n$ ,  $j<k$ .

**Regarding claim 3**, as shown in figures 2A-2B, Clarkson discloses the free space has a width  $D1$  equal to twice the pitch  $D$  of the vias array less a via size (clearly shown in the figures, also see par. 27), for accommodating 1 passive elements of a substantially similar width  $D1$  (see par. 30).

It is noted that the limitation "for accommodating  $m$  passive elements of a substantially similar width  $D1$ " is interpreted to only require the ability to so perform. In the case of product claim, only the structure of the claim distinguishes over the prior art. Furthermore, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ 2d 1647 (1987).

**Regarding claim 4**, Clarkson discloses  $m$  is at least one.



***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clarkson.

**Regarding claims 11 and 12**, Clarkson discloses every limitation as shown in claim 3 above, but fails to disclose the passive elements are 0603, 0402, 0201 or smaller decoupling capacitors/resistors.

It is noted that a selection of the type of passive component and its sizes is only a matter of design choice depending upon particular applications.

Therefore, it would have been an obvious matter of design choice to select the decoupling capacitors or resistors in the sizes of 0603, 0402, 0201 or smaller in order to meet a specific requirement of a particular application, since such modification would have involved a mere change in size of a component. Furthermore, a change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

**(10) Response to Argument**

(a) The Brief, Page 4, Claims 2, 5 and 6: The argument is persuasive, the rejection under 35 USC §112, second paragraph has been withdrawn.

(b) The Brief, Page 4, Claims 3, 4 and 9-12: The argument is that claims 3, 4, and 9-12 are included in the rejection under 35 U.S. C. 112, second paragraph based solely on their dependence from claim 2.

The argument is not persuasive. Claim 9 and 10 were not rejected based solely on their dependence from claim 2. In the Final rejection mailed on 12/04/2008, the Examiner rejected the claims 7-8 and 9-10 based solely on the errors on their limitations. Applicants cancelled claim 7-8 but not claims 9-10.

(c) The Brief, Page 5, Claims 1 and 2: The argument is that Clarkson does not disclose, teach or suggest shared vias.

The argument is not persuasive. As described in the Applicants' Specification, the "shared vias" is indeed power reference vias (power or ground vias) that formed next to a depopulated column of vias. The depopulated column of vias provides a free space column. The free space column provides room for passive components (capacitors) to be connected to the "shared vias". Therefore, the term "shared vias" is merely a title of power reference vias formed in a column next to a free space column which provides room for mounting passive components.

Figures 2A and 4A-4B of Clarkson clearly show at least one depopulated via column (the free space column in between reference characters 183 and 184 shown in figure 2A). At least two vias formed on the left or on the right column of the free space

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column are power and ground vias and can be used for mounting a decoupling capacitor (see paragraph 30) and the free space is where the capacitor resides. Thus, Clarkson discloses the "shared via" as described in claim 2 above.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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